

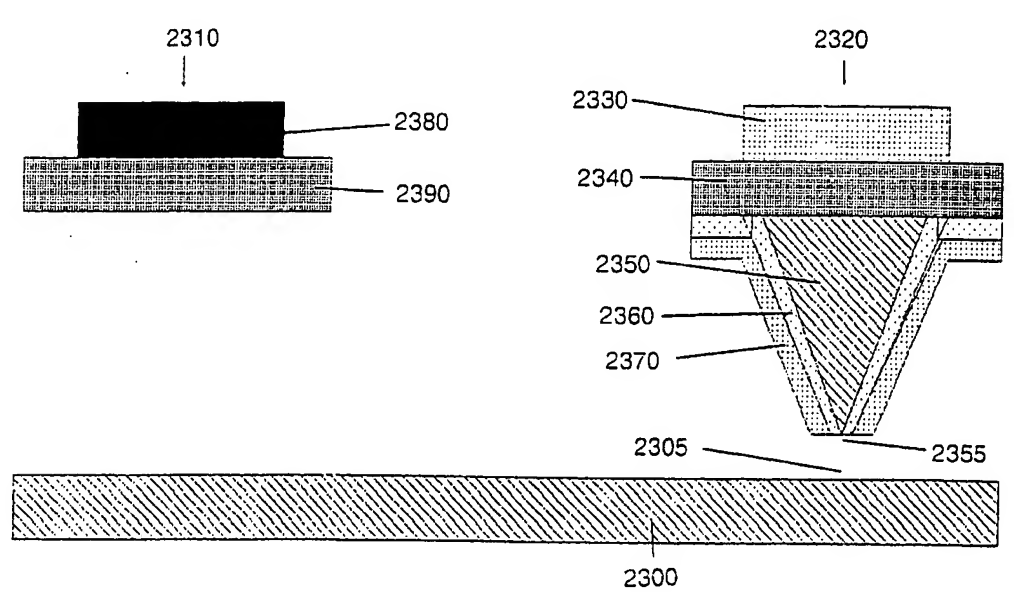


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : G11C		A2	(11) International Publication Number: WO 00/36608
			(43) International Publication Date: 22 June 2000 (22.06.00)
(21) International Application Number: PCT/US99/30326		(81) Designated States: JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 20 December 1999 (20.12.99)		Published <i>Without international search report and to be republished upon receipt of that report.</i>	
(30) Priority Data: 60/112,787 18 December 1998 (18.12.98) US 09/465,592 17 December 1999 (17.12.99) US			
(71) Applicant: LAZERUS NANO TECHNOLOGIES [US/US]; 43 Asilomar Circle, Oakland, CA 94611 (US).			
(72) Inventors: RUST, Thomas, F.; 43 Asilomar Circle, Oakland, CA 94611 (US). CULVER, Joanne, P.; 43 Asilomar Circle, Oakland, CA 94611 (US).			
(74) Agents: MEYER, Sheldon, R. et al.; Fliesler Dubb Meyer and Lovejoy LLP, Suite 400, Four Embarcadero Center, San Francisco, CA 94111-4156 (US).			
(54) Title: MOLECULAR MEMORY MEDIUM AND MOLECULAR MEMORY INTEGRATED CIRCUIT			
(57) Abstract			
<p>A molecular memory media having a media surface and a platform with read/write heads. The platform and media are moved to allow one of addition, removal, and repositioning of atoms, electrons, and charges on a surface of the media. The media is a material capable of storing data written to it, and detectable using a vibrating tip sensor that resonates at a free space value which is phase shifted when charges or anomalies on a surface of the media are present. Other methods of reading and writing to the media are presented. The media may be enhanced by augmenting grain boundaries of the media via deposition and removal of PMMA materials. Servo trenches and sync bits identify positions of the read/write heads and maintain alignment during memory operations.</p>			

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : G01B 7/34, H01J 3/14, 7/30, G11C 7/00, G11B 9/00	A3	(11) International Publication Number: WO 00/36608 (43) International Publication Date: 22 June 2000 (22.06.00)
(21) International Application Number: PCT/US99/30326 (22) International Filing Date: 20 December 1999 (20.12.99) (30) Priority Data: 60/112,787 18 December 1998 (18.12.98) US 09/465,592 17 December 1999 (17.12.99) US (71) Applicant: LAZERUS NANO TECHNOLOGIES [US/US]; 43 Asilomar Circle, Oakland, CA 94611 (US). (72) Inventors: RUST, Thomas, F.; 43 Asilomar Circle, Oakland, CA 94611 (US). CULVER, Joanne, P.; 43 Asilomar Circle, Oakland, CA 94611 (US). (74) Agents: MEYER, Sheldon, R. et al.; Fliesler Dubb Meyer and Lovejoy LLP, Suite 400, Four Embarcadero Center, San Francisco, CA 94111-4156 (US).		(81) Designated States: JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> (88) Date of publication of the international search report: 14 September 2000 (14.09.00)
(54) Title: MOLECULAR MEMORY MEDIUM AND MOLECULAR MEMORY INTEGRATED CIRCUIT  (57) Abstract A molecular memory media having a media surface (2300) and a platform with an electromagnetic radiation generating source (2310) and an electromagnetic radiation receptor (2320). The platform and media are moved to allow one of addition, removal, and repositioning of atoms, electrons, and charges on a surface of the media. The media is detectable using a vibrating tip sensor that resonates at a free space value which is phase shifted when charges or anomalies of reading and writing to the media are presented.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Larvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/30326

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : G01B 7/34; H01J 3/14, 7/30; G11C 7/00; G11B 9/00 US CL : Please See Extra Sheet. According to International Patent Classification (IPC) or to both national classification and IPC														
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 73/15; 250/306, 307, 492.2, 492.3; 365/112, 128, 151, 174; 369/101, 126, 176 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) East														
C. DOCUMENTS CONSIDERED TO BE RELEVANT														
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
Y,E	US 6,038,916 A (CLEVELAND et al.) 21 March 2000, Fig. 1.	8, 10, 11, 13-23, 21-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60												
X	US 5,453,970 A (RUST ET AL.) 26 September 1995, Fig. 1	1-60												
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>*A* document defining the general state of the art which is not considered to be of particular relevance</td> <td>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>*E* earlier document published on or after the international filing date</td> <td>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>*A* document member of the same patent family</td> </tr> <tr> <td>*O* document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>*P* document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family	*O* document referring to an oral disclosure, use, exhibition or other means		*P* document published prior to the international filing date but later than the priority date claimed	
* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention													
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone													
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art													
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family													
O document referring to an oral disclosure, use, exhibition or other means														
P document published prior to the international filing date but later than the priority date claimed														
Date of the actual completion of the international search 28 MARCH 2000		Date of mailing of the international search report 13 JUN 2000												
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer KIM-KWOK CHU Telephone No. (703) 305-3032												

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30326

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,251,200 A (HATANAKA et al.) 05 October 1993, Fig. 2	8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60
Y	US 5,216,631 A (SLIWA, JR.) 01 June 1993, Fig. 6.	8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60.
X -- Y	US 5,187,367 A (MIYAZAKI et al.) 16 February 1993, Fig. 3.	1-7, 9, 12, 24-26, 30-32, 34, 35, 38, 39, 42, 45, 47, 49, 52, 58 ----- 8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59, 60
X -- Y	US 4,987,312 A (EIGLER) 22 January 1991, Fig. 1:	1-7, 9, 12, 24-26, 30-32, 34, 35, 38, 39, 42, 45, 47, 49, 52, 58 ----- 8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59, 60

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30326

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

73/15; 250/306, 307, 492.2, 492.3; 365/112, 128, 151, 174; 369/101, 126, 176